Interim Guidance
Ordnance and Explosives Risk Impact Assessment

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Tables

1. Purpose. Ordnance and Explosives Risk Impact Assessment (OERIA) provides a method of risk assessment that is more easily understood by, and communicated to, stakeholders. The OERIA is used during the conducting of the Ordnance and Explosives (OE) Engineering Evaluation and Cost Analysis (EE/CA). OERIA provides a qualitative risk assessment for OE sites by using direct analysis of site conditions and human issues that create OE risk. The OERIA will be used as an input to an evaluation of response alternatives under the Effectiveness Criteria.

2. Background. The use of statistically based risk assessment and analysis techniques has often caused difficulty in stakeholder communications concerning risk and the role risk plays in comparing response alternatives and selecting a response action. The OERIA provides a qualitative risk assessment in lieu of a statistically based risk assessment that will allow more effective, clear risk communication among all stakeholders.

3. Processes and Procedures

3-1. Technical Project Planning. The project team should follow the Technical Project Planning (TPP) process to establish project objectives and response alternatives. In accordance with TPP, the project team should develop project objectives with the customers, stakeholders, and the regulators. The development of project objectives ensures that the goals and needs of the customer(s), stakeholders, and regulators are the foundation for selecting and implementing a response action. Additional information on the Technical Project Planning process is provided in EM 200-1-2 and from the OE Mandatory Center of Expertise (MCX). The OE MCX is developing OE specific TPP interim guidance for publication in the near future.

3-2. OE Risk Impact Assessment. The three steps in the OERIA process are:

1. Review base factors and identify additional factors to assess.
2. Develop baseline risk assessment.
3. Assess the response alternatives.

a. Step 1 – Review Base Factors and Identify Additional Factors to Assess. Review the basic risk factor categories listed below. Add any additional risk factors that are identified by the project team for assessment.

(1) The basic risk factor categories are:

1. Ordnance and Explosives Factors
   - Type
   - Sensitivity
   - Quantity or Density
   - Depth

2. Site Characteristics Factors
   - Accessibility
   - Stability

3. Human Factors

- Activities
- Population

(2) The characterization plan should take into account the data requirements to assess the risk factors selected from the list above for a given site.

b. Step 2. Baseline Risk Assessment. Risk Factors Requiring Assessment. Three categories of basic risk factors that should be evaluated are OE, Site Characteristics, and Human Factors. In addition, other risk factors identified in step 1 should be assessed. Only the basic risk factors are discussed below.

(1) OE. This category covers the physical characteristics (OE type, sensitivity) and location/extent (density, quantity, depth) of OE at a given site.

(a) Type. The type of OE affects the likelihood and severity of injury if OE functions when encountered by an individual. Table 1 shows the four levels of risk used for completing the baseline risk assessment in order from highest to lowest potential hazard.

(b) Sensitivity. OE Sensitivity affects the likelihood of the item functioning as designed when encountered by an individual. For purposes of completing the baseline risk assessment, Table 2 lists four levels of OE sensitivity in order from highest to lowest sensitivity. The information in Table 2 should be amplified with information on activities that could cause the OE present to function (e.g., pressure from stepping on the item, fuze activation from moving the item, etc.).

(c) Density or Quantity. OE density or quantity affects the likelihood that an individual will encounter OE at the site. Relationships exist between density/quantity and the likelihood of encountering OE on the site. The nature of the density or quantity of OE at the site (e.g., distribution, location, etc.) should be explained in as much detail as possible.

(d) Depth. OE depth, when considered along with site activities (see paragraph (3)(a) below), affects the likelihood that an individual will encounter OE present at a site. Generally speaking, the deeper the OE, the less likely anyone will encounter it. However, the site activities must also be examined to ensure this general rule holds true for a given site.

(2) Site Characteristics. This category refers to the physical conditions of the site and natural events that may occur at the site.

(a) Site Accessibility. The accessibility of the site affects the likelihood of individuals encountering OE. The presence or absence of man-made or natural barriers to the site affects the level of accessibility to a given site. Using the descriptions in Table 3, the relative accessibility of the site can be assessed. Man-made barriers can include walls and fences. Natural barriers can include the terrain or topography of the site and vegetation.

(b) Site Stability. Site stability affects the likelihood of individuals encountering OE as a result of changing conditions on the site caused by natural processes. These natural processes include recurring events (e.g., frost heave, sand movement, or erosion) or extreme, infrequent

events (e.g., tornados, earthquakes, or hurricanes). Using Table 4, the level of site stability can be assessed based upon knowledge of natural processes present at the site.

(3) Human Factors. This category refers to the types of activities that exist on the site, the number of people that may have access, and the frequency of the access to the site on a daily basis.

(a) Site Activities. The types of activities conducted at a site are related to the likelihood of individuals encountering OE. The types of activities may be generally classified as recreational (hiking, camping, biking, etc.) and occupational (farming, industrial, etc.). The level of potential encounter for an activity can be determined using Table 5. The levels are 'Low', 'Moderate', and 'Significant', each referring to the relative probability that performing a given activity will result in an individual encountering OE. The relative probabilities in Table 5 are generally associated with the depth of intrusive actions (into the earth) caused by a given activity compared to the actual depth that OE is found at the site. The minimum depth of OE is used as input to Table 5.

(b) Population. The number of people using the site and the frequency of that use affects the likelihood of an individual encountering OE. An estimate of the number of people using a site, and the frequency of that use, is determined based on the type and location of the site, access restrictions, natural and/or man-made barriers, surrounding population, and other demographics.

(4) The assessments of the three risk factor categories are then put into the first line (Baseline Risk Assessment (Existing Conditions)) of the OERIA Table. A blank OERIA Table is shown in Table 6.

c. Step 3 – Assess the Response Action Alternatives.

(1) Overview. After completing the baseline risk assessment, the response action alternatives are assessed using the basic risk factors in the OERIA Table and other risk factors identified in step 1 for a given site. Table 7 provides an example of an OERIA Table completely filled in with baseline risk assessment and response action alternatives assessment data.

(2) Ranking of Response Action Alternatives for Each Basic Risk Factor. The response action alternatives are analyzed and ranked using each risk factor identified in the baseline risk assessment. Each response action alternative will be assigned an impact evaluation score of 'No Impact' or an alphabetical rank from 'A' to 'D' representing the relative impact of the response action alternative – with 'A' being the highest impact and 'D' being the lowest ('D' is used to notate the lowest impact when there are 4 alternatives, 'E' when there are 5 possible alternatives, etc.). This comparison provides a qualitative indication of the change in the potential for harm and level of protectiveness at the site for each response action alternative that could be implemented. For example, the response alternative of No Department of Defense (DoD) Action Indicated (i.e., a response action will not be conducted) may be compared to the response alternative of surface clearance. The OERIA will qualitatively compare the level of protectiveness and potential for harm as a result of implementing each response action

alternative, including taking no action at a given site.

(3) Overall Ranking of Response Alternatives. The project team will assign an overall alphabetical rank to each response action alternative based upon the impact ranks for each factor. The response action alternative that provides the greatest impact on risk from OE (i.e., achieves the most reduction of the risks posed by the site) will be assigned an 'A'.

(4) Reporting. The results of this qualitative review should be presented to the customer, stakeholders and other interested community members in the EE/CA report. The OERIA results should then be applied in the evaluation of removal alternatives. The OERIA results will be an input to the evaluation of the Effectiveness Criteria.

Table 1 - OE TYPE CATEGORIES

Category	Description
3	OE that will kill an individual if detonated by an individual's activities
2	OE that will cause major injury to an individual if detonated by an individual's activities
1	OE that will cause minor injury to an individual if detonated by an individual's activities
0	Inert OE or scrap, will cause no injury

Table 2 - OE SENSITIVITY CATEGORIES

Category	OE Sensitivity
3	OE that is very sensitive
2	OE that is less sensitive
1	OE that may have functioned correctly or is unfuzed but has a residual risk
0	Inert OE or scrap, will cause no injury

Table 3 - OE SITE ACCESS LEVELS

Access Level	Access Description
No Restriction to Site	No man-made barriers, gentle sloping terrain, no vegetation that restricts access, no water that restricts access
Limited Restriction to Access	Man-made barriers, vegetation that restricts access, water, snow or ice cover, and/or terrain restricts access
Complete Restriction to Access	All points of entry are controlled

Table 4 - OE SITE STABILITY RISK LEVELS

Stability Level	Stability Description
Site Stable	OE should not be exposed by natural events
Moderately Stable Site	OE may be exposed by natural events
Site Unstable	OE most likely will be exposed by natural events

Table 5 - ACTIVITIES OE CONTACT PROBABILITY LEVELS

Examples of Activities	Actual Depth of OE	Contact Level
Child Play, Short Cuts, Hunting, Fishing, Hiking, Swimming, and Jogging,	0-6”	Significant
	6”-12”	Low
	>12”	Low
Picnic, Camping, Metal Detecting	0-6”	Significant
	6”-12”	Moderate
	>12”	Low
Construction, Archaeology, Crop Farming	0-6”	Significant
	6”-12”	Significant
	>12”	Moderate

Table 6 - OE RISK IMPACT ASSESSMENT

	Ordnance				Site		Human		Overall Rank
Alternatives	**Type**	**Sensitivity**	**Density**	**Depth**	**Access**	**Stability**	**Activity**	**Population**	
Baseline Risk Assessment (Existing Conditions)									
No DoD Action Indicated									
Institutional Controls									
Surface With Institutional Controls									
Clearance to Detectable Depth With Institutional Controls									

Table 7 - OE RISK IMPACT ASSESSMENT

	Ordnance				Site		Human		Overall Rank
Alternatives	**Type**	**Sensitivity**	**Density**	**Depth**	**Access**	**Stability**	**Activity**	**Population**	
Baseline Risk Assessment (Existing Conditions)	Cat 1 22 mm	Cat 2	0.18	0-6”	No restriction to site	Site stable	Significant (hiking, other recreational)	~200 per day	
No DoD Action Indicated	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	D
Institutional Controls	No Impact	No Impact	No Impact	No Impact	A	No Impact	A	A	B
Surface With Institutional Controls	No Impact	No Impact	B	B	A	No Impact	C	B	B
Clearance to Detectable Depth With Institutional Controls	A	A	A	A	No Impact	No Impact	B	C	A